Massachusetts School Building Authority

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MSBA Guidelines for Science Labs

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www.MassSchoolBuildings.org



Introduction:

Nov 4, 2009 Science Lab Task Force

- Participants
  - MSBA Board members and staff, DESE staff, local architects, construction management consultants, science and technology consultants, science educators, science lab safety consultants
- Task Force Goals
  - Obtain feedback from experts and practitioners on recent construction and designs
  - Inform MSBA of optimal science classroom / lab design
  - Make recommendations to update MSBA guidelines



Introduction:

Science Lab Task Force

- Summary Themes
  - Curriculum should drive design
  - Rooms should be flexible to accommodate all science disciplines and reduce the cost of potential future renovations
  - Create Science lab spaces that are designed to support a variety of science functions to optimize overall utilization
  - Safety must be a top priority – overcrowding must be limited

Introduction:

Science Lab Task Force

Typical Pre-MSBA Lecture / Lab Configuration

"Restricted" area

217 nsf (15% of room)

Room Size: 1,475 SF
24 Students / 1 Instructor
25 SF /student in Lab Area

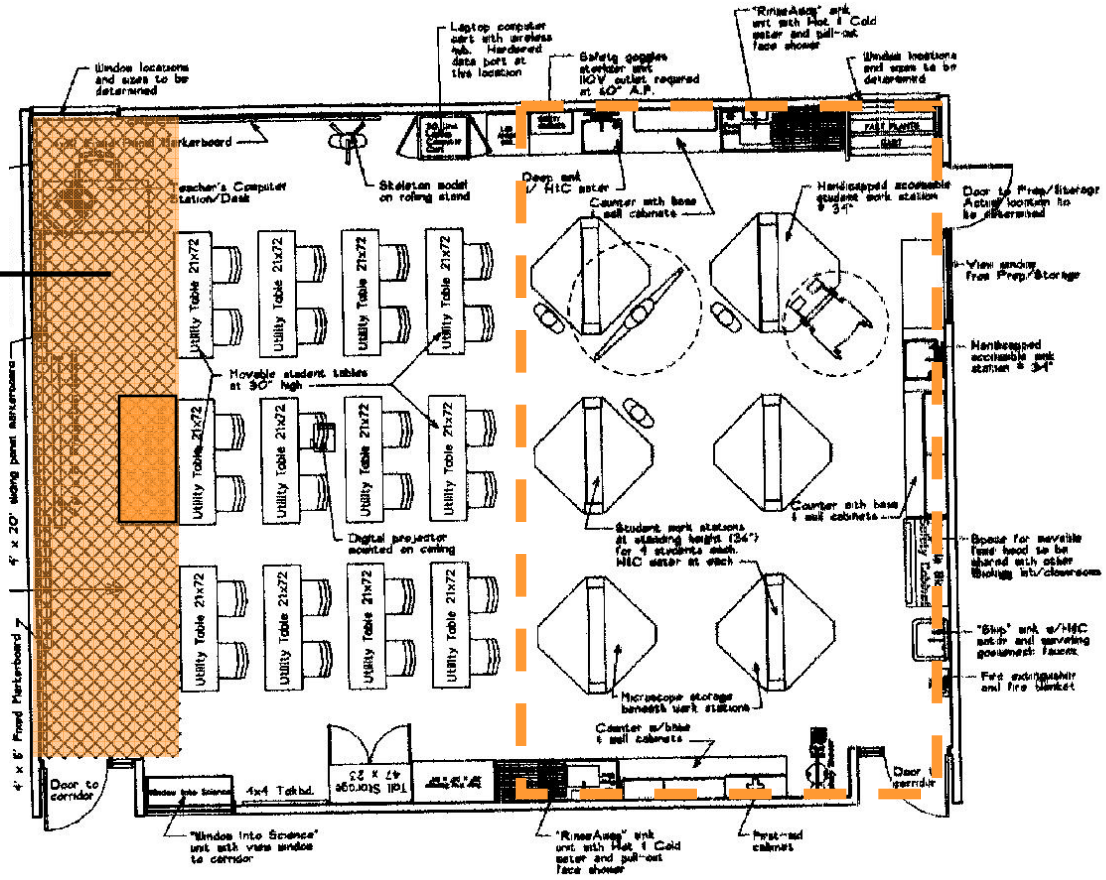


Image provided by James T. Biehle
Inside Out Architecture



Conclusion:

MSBA Prototype Design

- Requirements
  - The MSBA allotment of 1,440 nsf for each science lab is based on 60 nsf per student (24 students). Smaller science classrooms may be considered if the class size is smaller, with a minimum of 60 nsf per student.
  - The district and design team should provide for a science lab layout that allows as much flexibility and universality as practical, given the districts science department educational plan.
  - Both lab and lecture configurations must be accommodated in every designated science lab room. Separate labs and lecture rooms are not permitted.
  - No raised lab utilities, that may restrict flexibility, are to be provided in the central floor area of the science labs. Utilities from a grid suspended from the ceiling may be needed for some disciplines, but only if the peripheral utilities cannot accommodate most needs.
  - No fixed casework is permitted in the central floor area.



Conclusion:

MSBA Prototype Design

- Best Practices
  - Sturdy, standing-height two-student tables should match the height of peripheral countertops so that students perform lab work standing (preferable) and "seat work" on stools. Two-student tables (not larger) are recommended so they can be moved into a variety of configurations. Adjustable-height tables are not recommended.
  - Stub utilities where needed for potential future configurations.
  - Sinks should be wide and deep enough to accommodate buckets and other large containers.
  - Optional fume hoods and bio-safety cabinets should be accessible from both the prep room and the classroom.
  - Provide full black-out window treatment in labs.
  - Provide moveable teacher demonstration tables. (not fixed)
  - Each lab prep room should include one refrigerator and one dishwasher.



Conclusion:

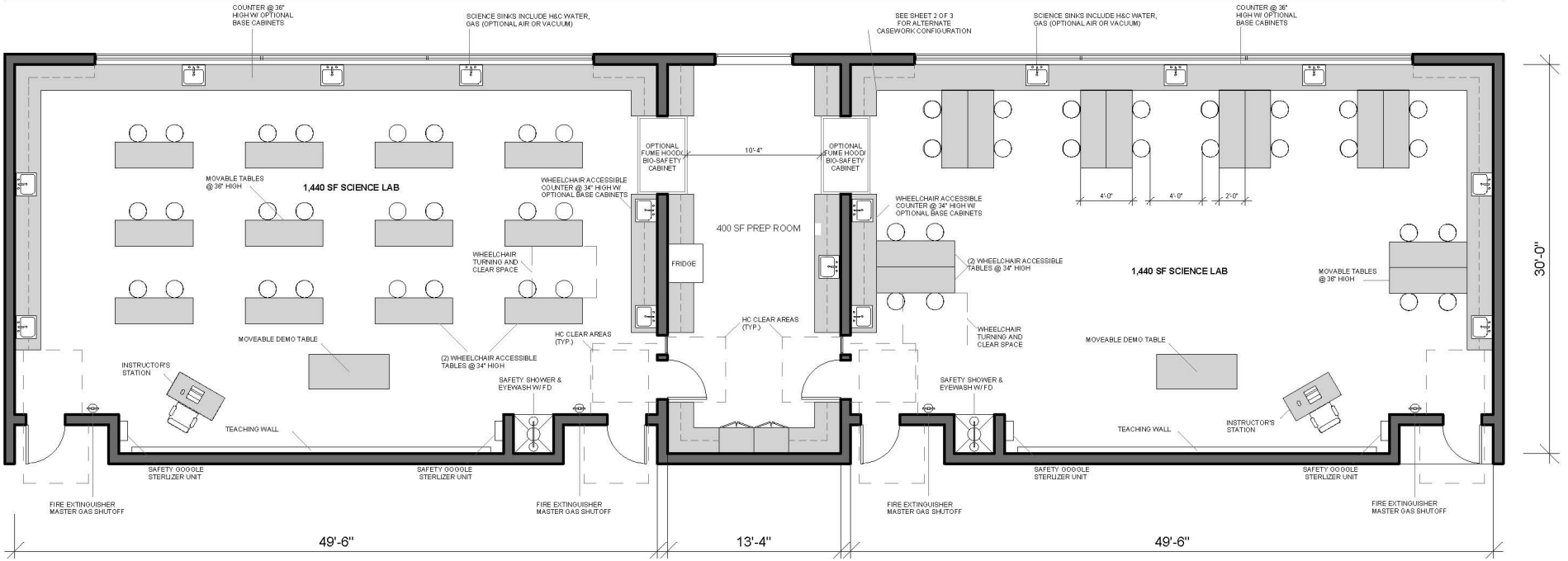
MSBA Prototype Design

- Best Practices (continued)
  - Provide visual access between labs and prep rooms / prep room doors.
  - Shared spaces can be reduced in area, with saved areas reallocated elsewhere as needed.
  - Prep rooms and chemical storage should be keyed in such a way to provide limited access, for required personnel only.
  - At the districts discretion, chemical storage can be divided into satellite storage rooms, but chemical storage in prep rooms is discouraged.
  - Safety equipment and information such as fire blankets, sterile eye-protection, and material safety data sheets (MSDS) should be located in highly-visible and easily-accessed places, preferably near exits and other required safety equipment.
  - Rather than green houses, consider designs that allow plants to be placed on shelves or moveable racks with access to light from classroom windows.
  - At least two means of egress from each lab should be provided (the building code may require this, depending on area).

Conclusion:

Prototype Design

- Scheme A



Front Facing / Large Group Instruction / Teams of 2 Configuration

Lab Configuration 1

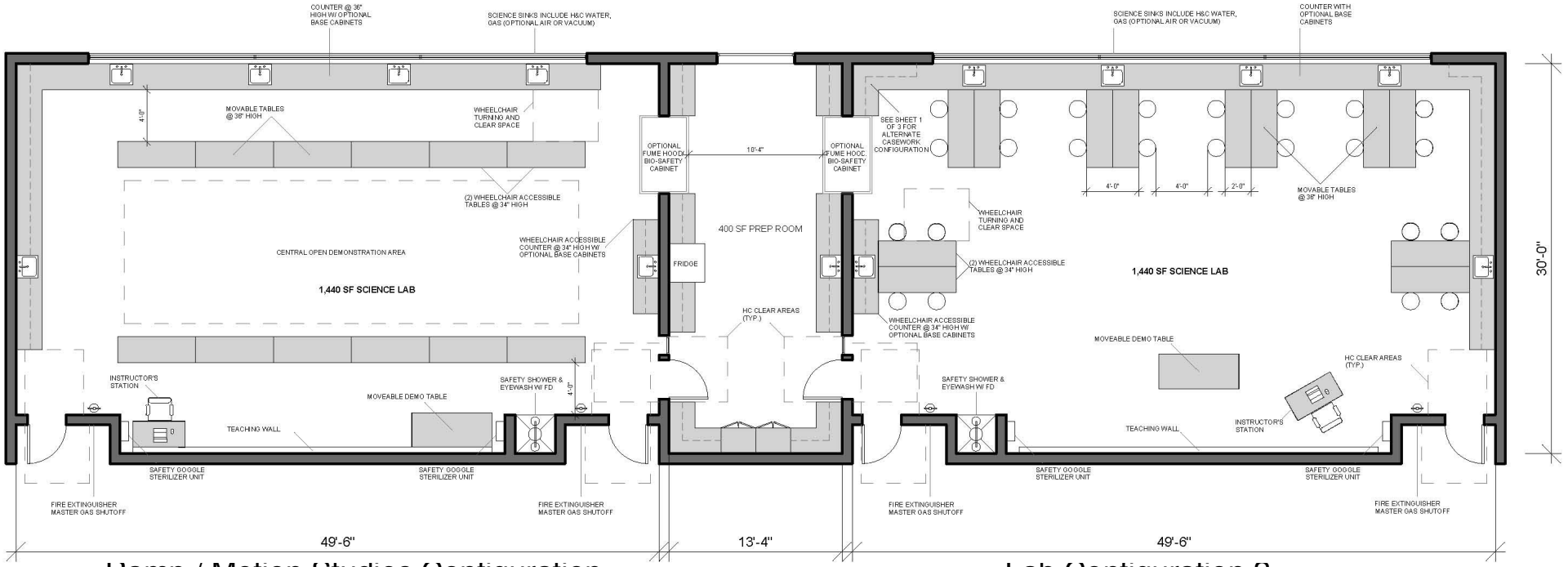
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60 SF /student in Lab Area

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Conclusion:

Prototype Design

- Scheme B



Ramp / Motion Studies Configuration

Lab Configuration 2

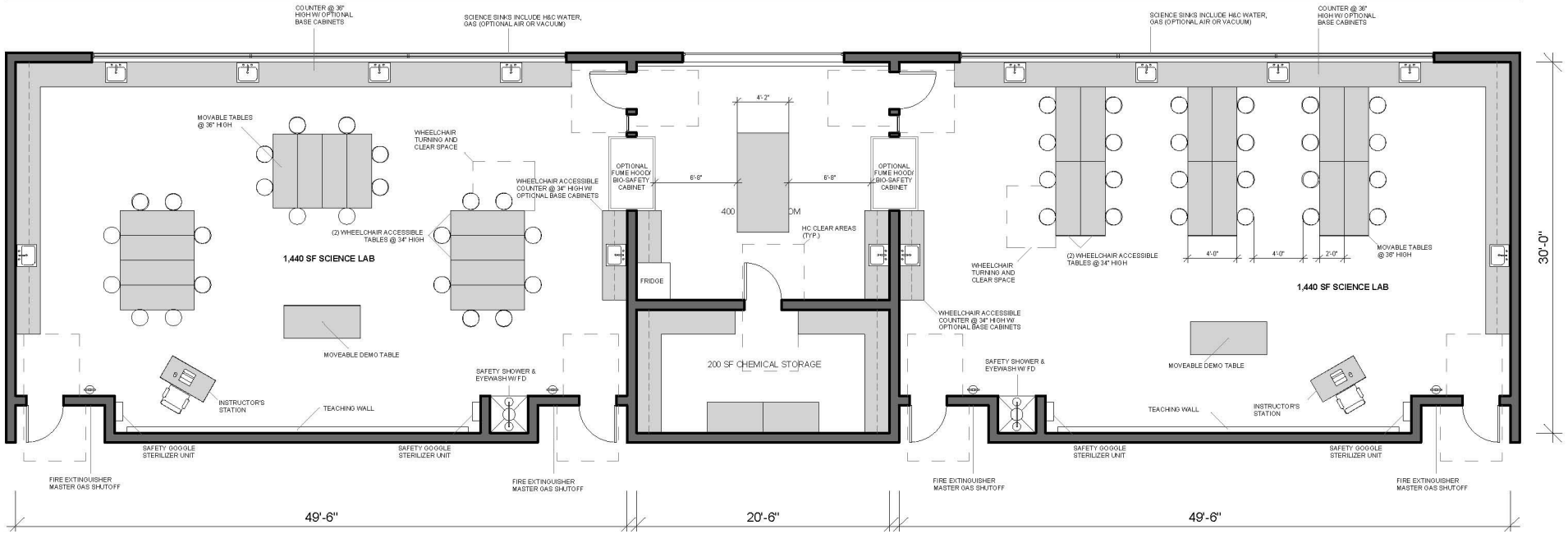
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Conclusion:

Prototype Design

- Scheme C (showing chemical storage room)



Mid-size group / Robotics Configuration 1

Mid-size group / Robotics Configuration 2

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60 SF /student in Lab Area

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